IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of: Nguyen et al.
Serial No.: 10/824,836
Filed: 04/15/2004
For: LOW LOSS CHALCOGENIDE GLASS AND PROCESS FOR MAKING SAME USING ARSENIC MONOCHALCOGENIDE
Examiner: Lazorcik, Jason L
Art Group Unit: 1731

DECLARATION UNDER 37 C.F.R. § 1.132 OF VINH NGUYEN

I, Vinh Nguyen, hereby declare that:

1. I am a co-inventor of the invention claimed in the above-identified patent application. My position at the US Naval Research Laboratory is research scientist. I consider myself qualified to testify the field of high purity materials. My CV is attached.

2. Attached is a graph comparing the attenuation of two arsenic sulfide glasses made by distilling arsenic monosulfide and sulfur, followed by drawing into a fiber. The arsenic/sulfur ratio in both glasses was approximately the same [approximately 39/61].

3. Line (a) shows the results for glass made by distilling at 750°C in a closed vacuum system, as in Churbanov et al. *J. Optoelectronics and Adv. Mat.*, **3**(2), 341-349 (2001). The graph shows several major absorbances. Notably, there is a very large attenuation at about 4 microns due to S-H bonds. These bonds are believed to be formed because arsenic monosulfide decomposes at high temperatures, such as above about 550°C. After decomposition, the sulfur bonds to hydrogen found in the vessel walls. Such decomposition also occurs in other arsenic monochalcogenides.

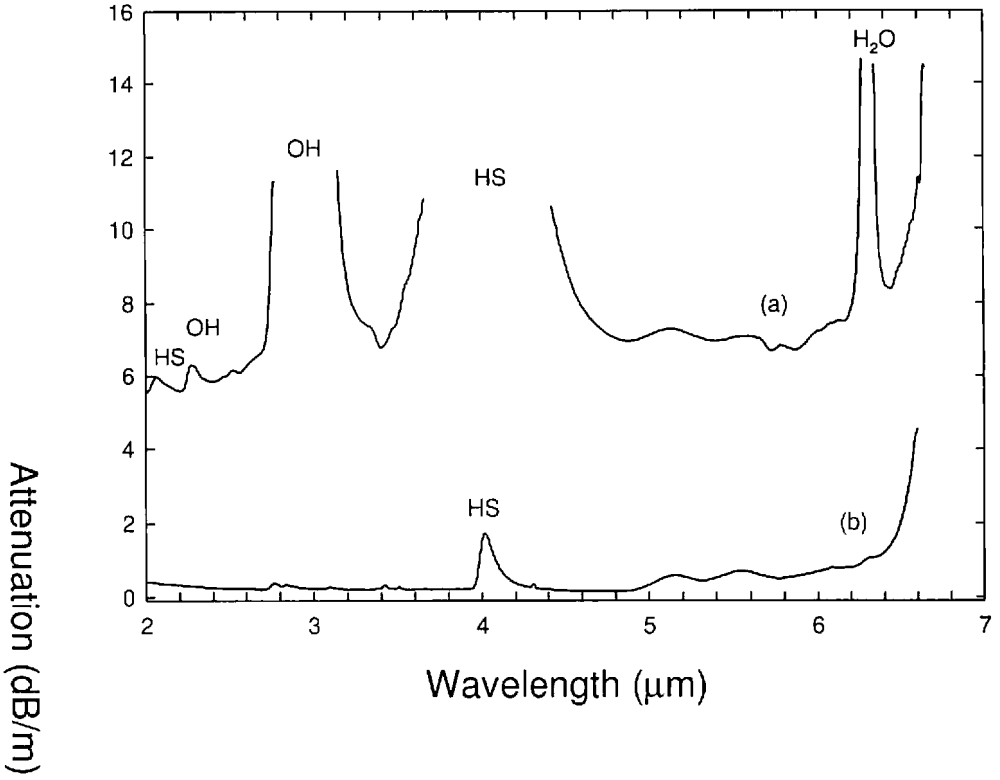
4. Line (b) shows the results for glass made by distilling at 450°C in an open vacuum system. The absorbance at 4 microns is greatly reduced, as are several other peaks. At this lower distillation temperature, arsenic monosulfide does not decompose and very little S-H is formed. This results in a glass that may be more useful for transmission in the 4 micron range.

5. The open vacuum system enables distillation at the lower temperature. If the system were closed at the low temperature, glass vapors would build up in the vessel to the point where it would be necessary to raise the temperature for distillation to continue, which would cause the described decomposition of arsenic monochalcogenide. In an open system, glass vapor does not build up, so distillation may continue at the low temperature.

6. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

12/11/07
Date

V. L. Nguyen
Vinh Nguyen



The figure shows the comparison between fibers made using (a) high temperature distillation at 750C in a closed system following the processes adopted by literature, and (b) using the disclosed process in the new invention, by distilling at 450C.

Vinh Q. Nguyen

PROFILE

- Fifteen years experiences in materials technology and processing/manufacturing development of advanced materials.

EMPLOYMENT HISTORY

1. Naval Research Laboratory (NRL), Optical Science Division, Washington DC; June 92 to Present. Title: Materials Engineer.

- Provide technical leadership in the Infrared Optical Fiber (IOF) program. The fiber products of this program were delivered to the infrared Counter Measurement (IRCM) Program. I successfully negotiated with Navy, Army, and Air Force management to obtain funding in support to the IOF program. I also developed a cooperative relationship with Lucent Technology and Corning Inc. and technology transfer agreements between the NRL and CorActive High Tech Inc. to license this technology. Provided technical training and manufacturing support to CorActive High Tech Inc. in Quebec, Canada.

- Provided technical leadership and management in the infrared glasses and optical fibers fabrication. I coordinated and performed analysis at all levels: concept, design, fabrication, cost evaluation, and effectiveness for overall manufacturing systems.

- Evaluated innovative methods to improve overall design and performance of manufacturing processes. I developed strategic plans and solutions to a variety of complex manufacturing problems. Specifically, I have been responsible for developing engineering solutions to processing problems associated with the fabrication of the chalcogenide based glasses.

- Provided technical leadership to junior members of the team. I provided processing guideline and schedule to users for operating the infrared glass facility.

2. University of California at Los Angeles, Materials Science & Engineering Dept. 10/90-5/92
Graduate Student Researcher

- Designed and developed two processes to consolidate low-level radioactive waste using a 700 W, 2.45 GHz microwave applicator and various additives such as magnetite (Fe_3O_4), sodium carbonate (Na_2CO_3), lithium carbonate (Li_2CO_3), and boron oxide (B_2O_3).
- Coordinated efforts between UCLA and Los Alamos National Laboratory to develop radioactive material processes meeting EPA requirements.
- Conducted physical property measurements, structural characterizations, and leachability test.

3. University of California at Irvine, Materials Science & Engineering Dept. 3/88-6/90
Research Assistant

- Led independent studies and class design projects working in the field of advanced rapid solidification technology.
- Designed a device that injects SiC particulates (5-10 μm) into a molten aluminum spray. I also designed an atomizer for spraying the molten aluminum. Calculated and measured the nozzle velocity as a function of inlet atomization pressure and inert nitrogen/helium gas.
- Analyzed the particle size distribution of the atomizer as a function of atomization pressure. Measured mechanical properties such as tensile strength and Vicker hardness.

TEACHING EXPERIENCE

1. ClubZHomeTutoring, Fairfax Virginia (http://www.virginiatutoring.com/) 1/04-Present

- Pre-Algebra, Geometry, Chemistry, Physic, Trigonometry, AP Calculus tutoring.

2. **University of Maryland, College Park** **9/93-12/98**
   - Physic, Chemistry, Math Tutor – General physic, chemistry, and calculus.
   - Engineering Tutor – *Statics*, *Dynamics*, Thermodynamics.

3. **University of California at Los Angeles, Materials Science & Eng. Department** **01/92-4/92**
   - Teaching Assistant – *Introduction to Metallurgical Thermodynamics* course. Explain thermodynamic concepts to undergraduate student. Graded homework.

4. **University of California at Irvine, Mathematics Department** **9/87-6/90**
   - Math Tutor and Grader – Calculus. Grade homework and quiz.

AWARDS AND PROFESSIONAL AFFILIATIONS

- Naval Research Laboratory Contribution Award, September 2000 - 2006.
- 2004, 2006 Alan Berman Publication Award at the Naval Research Laboratory.
- 2007 Technology Transfer Award, Code 5606.
- Members of Phi Kappa Phi and Materials Research Society.

EDUCATION

- **Ph.D. in Materials Science and Engineering**, University of Maryland, College Park, May 1999. Thesis: *Fabrication of low-loss infrared transmitting chalcogenide optical fibers.* GPA: 4.0/4.0.

- **M.S. in Materials Science and Engineering**, University of California, Los Angeles, June 1992. Thesis: *Immobilization of low-level radioactive waste via microwave heating.* GPA: 3.8/4.0.

- **B.S. in Mechanical/Industrial Engineering**, University of California, Irvine, June 1990. GPA: 3.3/4.0

PATENTS

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6. "Surface Relief Gratings in AsSe Glass Fabricated Under 800nm Laser Exposure", C. Florea, J. Sanghera, L.B. Shaw, V.Q. Nguyen, and I.D. Aggarwal. Materials Letters vol. 61/6 (2007) p 1271-1273.

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PRESENTATIONS

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2. "Progress of Chalcogenide Glass Fibers", J.S. Sanghera, L.B. Shaw, P. Pureza, V. Nguyen, D. Gibson, I.D. Aggarwal, and C. Florea. **Invited talk** at OFC, Anaheim, CA March 25-29, 2007.

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